yw

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,694	12/14/2001	Wei-Ge Chen	3382-61340	5690

26119 7590 01/26/2005

KLARQUIST SPARKMAN LLP
121 S.W. SALMON STREET
SUITE 1600
PORTLAND, OR 97204

EXAMINER	
STORM, DONALD L	
ART UNIT	**PAPER NUMBER**
2654	

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/017,694	Applicant(s) CHEN ET AL.	
	Examiner Donald L. Storm	Art Unit 2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *December 14, 2001 through January 13, 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-100* is/are pending in the application.

4a) Of the above claim(s) *26-100* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/6/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-25 drawn to a computer-readable medium encoded with instructions and a method of quality-controlled quantization, classified in class 704, subclass 230.

II. Claims 26-39, drawn to a method and apparatus of measure of signal complexity that regulate quantization of audio, classified in class 704, subclass 227.

III. Claims 40-50, drawn to an apparatus and computer-readable medium encoded with instructions for a method of regulating quantization of audio blocks, classified in class 704, subclass 224.

IV. Claims 51-64 and 75 drawn to a method and a computer-readable medium encoded with instructions for a method of quality-controlled encoding or bit rate-controlled encoding, classified in class 704, subclass 229.

V. Claims 65-74, drawn to a method and computer-readable medium encoded with instructions for a method of selecting quantization level, classified in class 704, subclass 222.

VI. Claims 76-90 drawn to an apparatus and computer-readable medium encoded with instructions for a method of regulating quantization of audio, classified in class 704, subclass 223.

VII. Claims 91-100, drawn to an apparatus and computer-readable medium encoded with instructions for a method of regulating quantization of audio blocks, classified in class 704, subclass 201.

2. The inventions are distinct, each from the other because:

a. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as selecting audio characteristics to quantize.

b. Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as readying disparate blocks for comparisons.

c. Inventions I and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention IV has separate utility such as separate adjustment of quantization measures.

d. Inventions I and V are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention V has separate utility such as selecting quantization efficacy.

e. Inventions I and VI are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention VI has separate utility such as selecting characteristics to quantize audio.

f. Inventions I and VII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be

separately usable. In the instant case, invention VII has separate utility such as flow control of encoded audio.

g. Inventions II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as selecting audio characteristics to quantize.

h. Inventions II and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as selecting audio characteristics to quantize.

i. Inventions II and V are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as selecting audio characteristics to quantize.

j. Inventions II and VI are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as selecting audio characteristics to quantize.

k. Inventions II and VII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as selecting audio characteristics to quantize.

l. Inventions III and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as readying disparate blocks for comparisons.

m. Inventions III and V are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as readying disparate blocks for comparisons.

n. Inventions III and VI are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as readying disparate blocks for comparisons.

o. Inventions III and VII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as readying disparate blocks for comparisons.

p. Inventions IV and V are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention IV has separate utility such as separate adjustment of quantization measures.

q. Inventions IV and VI are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be

separately usable. In the instant case, invention IV has separate utility such as separate adjustment of quantization measures.

r. Inventions IV and VII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention IV has separate utility such as separate adjustment of quantization measures.

s. Inventions V and VI are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention V has separate utility such as selecting quantization efficacy.

t. Inventions V and VII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention V has separate utility such as selecting quantization efficacy.

u. Inventions VI and VII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention VII has separate utility, such as flow control of encoded audio.

3. Because the inventions of Groups I through VII are distinct for the reasons given above and different fields of search are required for the divergent and differently classified subject matter, it would be a serious burden on the Examiner to search and examine claims directed to the

differently presented independent and distinct inventions. Therefore, restriction as indicated for examination purposes is proper. (See MPEP § 803, MPEP §821.0337, and CFR 1.142(b)).

4. During a telephone conversation with Mr. Kyle B. Rinehart, Attorney of Record, on January 12, 2005 a provisional election was made without traverse to prosecute the invention of Group 1, claims 1-25. Affirmation of this election must be made by applicant in replying to this Office action even though the requirement be traversed (37 CFR 1.143). Claims 26-100 are withdrawn from further consideration by the Examiner, 37 CFR 1.142(b), as being drawn to non-elected inventions.

5. The Applicants are reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Response to Amendment

6. The Applicant's Interview Summary filed on January 13, 2005 of the interview is substantively acceptable to the Examiner.

Specification

7. The specification is objected to because references to related applications should be made by application number and filing date. The citations to nonprovisional applications should be

brought up to date if any of the applications have been abandoned or matured into patents, and as appropriate, the application serial numbers or patent numbers should be included. Including current titles of the applications is encouraged. References to foreign applications or to applications identified only by the attorney's docket number should be cancelled. See MPEP 608.01 SPECIFICATION. Correction should be made throughout the disclosure, for example:

a. At page 1, line 5, should the identification "aa/bbb,ccc" be --10/020,708--?

b. At page 1, line 8, should the identification "aa/bbb,ccc" be --10/016,918--?

c. At page 1, line 10, should the identification "aa/bbb,ccc" be --10/017, 702--?

d. At page 1, line 12, should the identification "aa/bbb,ccc" be --10/017,861--?

Claim Informalities

8. Claim 25 is objected to under 37 CFR 1.75(a) because it does not end with a period. Each claim begins with a capital letter and ends with a period to avoid undue confusion in determining if the claim is complete. Appropriate correction is required. See MPEP § 608.01(m).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Chiang '846

10. Claims 1-3 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiang et al. [US Patent 6,160,846] (Chiang '846).

11. Regarding claim 1, Chiang '846 [at abstract] describes a computer embodiment in which quality of information is controlled at constant bitrate and output at variable quality. Chiang '846 describes the content and functionality of the recited limitations recognizable as a whole to one versed in the art as the following terminology:

computer-readable medium encoded with computer-executable instructions for causing a computer programmed thereby to perform a method [at column 24, lines 59-62, as a computer-readable medium having stored instruction which, when executed, cause a processor to perform steps];

quantizing a block of information [see Fig. 1, items 100, 170, 171, and their descriptions, especially at column 7, lines 36-38, as quantize a block of coefficients]; and

entropy coding it [see Fig. 1, items 171, 180, and their descriptions, especially at column 8, lines 21-37, as encode the quantized coefficients with other types of entropy coders];

quantize to meet constant (or relatively constant) bitrate requirements [see Fig. 130, 170, 195, and their descriptions, especially at column 4, lines 20-24, as the encoder regulates the output bit rate to match the channel rate of a constant capacity channel];

the size of the quantizing is the quantization step size [at column 2, lines 1-2, as quantizer scale (step size)];

the encoder adjusts size of the quantizing in view of a target quality parameter for the block [see Fig. 1, items 100, 130, 170, 171, and their descriptions, especially at column 4, lines 22-42, as the encoder apparatus and method adjusts the quantizer scale to maintain the overall quality of the picture for successive macroblocks with the macroblock];

thereby reducing number of changes in quality [at column 9, lines 8-11, as the quantifier scale is derived to maintain a constant quality];

and smoothing transitions between the changes in quality [at column 4, lines 35-42, as the picture for successive macroblocks is achieved to produce a uniform visual quality].

12. Regarding claim 2, Chiang '846 also describes:

the encoder adjusts it also in view of a target minimum-bits parameter [see Fig. 100, 130, 190, and their descriptions, especially at column 8, lines 51-57, of the rate control module of the encoder selects a quantizer scale to adjust the bit rate to prevent an underflow number of bits generated];

and the encoder adjusts it also in view of a target maximum-bits parameter [see Fig. 100, 130, 190, and their descriptions, especially at column 8, lines 51-57, of the rate control module of the encoder selects a quantizer scale to adjust the bit rate to prevent an overflow number of bits generated].

13. Regarding claim 3, Chiang '846 also describes:

the encoder adjusts the quantization step size also in view of one (or more) complexity estimates [see Fig. 2, item 220 and its description, especially at column 12, lines 40-column 13, line 2, of encoder rate control using a complexity estimate constant X_0];

and the encoder adjusts the quantization step size also in view of one (or more) complexity estimate noise measures [see Fig. 2, item 220 and its description, especially at column 12, line 40-column 13, line 2, of encoder rate control using a change-from-constant complexity estimate X_1/Q_i].

14. Regarding claim 7, Chiang '846 also describes:

the adjustment also accounts for non-monotonicity of quality as a function of step size [see Fig. 4, items 415-400, and their descriptions, especially at column 14, lines 31-32, of, in effect, determining hat the distortion is decreasing as T (the bit budget) is decreased].

Jacobs

15. Claims 10, 12-17, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacobs et al. [US Patent 5,414,796].

16. Regarding claim 10, Jacobs [at column 46, lines 33-41] describes the computer-implemented method in an audio encoder of speech by describing the content and functionality of the recited limitations recognizable as a whole to one versed in the art as the following terminology:

compressing [at column 2, lines 39-42, as perform variable rate vocoding to accomplish compression];

it is a block of frequency coefficients that are compressed [see Fig. 7, items 208, 210, 222, and their descriptions, especially at column 25, lines 7-10, of an encoded frame of LSP frequencies];

including quantizing it [see Fig. 12, items 442, 454, and their descriptions, especially at column 24, lines 4-6, of implementing quantization of the current frame LSPs];

comparing a quality measure for it to a quality target [see Fig. 12, items 442, 444, and their descriptions, especially at column 24, lines 18-23, of comparing a resulting value that results from

current frame LSPs and that is used to ensure quality to a threshold that provides an indication to ensure quality];

a bit count measure for the block [at abstract, as rate corresponding to number of bits representative of frame];

comparing it to a minimum-bits target [at column 15, lines 48-49, as "if" the rate is less than the lowest rate allowed];

and comparing it to a maximum-bits target [at column 15, lines 45-46, as "if" the rate is greater than the highest rate allowed].

17. Regarding claim 12, Jacobs also describes:

a first quantization loop includes the quantizing and the comparing the quality measure [see Fig. 4, items 88, 90, 92, and their descriptions, especially at column 11, lines 16-21, of quantize, test rate, increase rate, quantize, . . .];

a second quantization loop includes the comparing the bit count measure [see Fig. 9, items 270, 272, 274-292, 296, and their descriptions, especially at column 16, line 16-column 17, line 27, of computing the threshold, comparing, cycling, computing the threshold, . . .];

the second loop is delinked from the first loop [see Fig. 4, items 84,86, 88, 90, 92, and their descriptions, with DECIDE RATE separated from QUANTIZE LSP by LPC TO LPS TRANSFORM].

18. Regarding claim 13, Jacobs also describes:

the quality target is for the block [at column 24, lines 18-23, of a threshold that provides an indication to ensure quality compares a resulting value that results from current frame LSPs];

the minimum-bits target and the maximum-bits target are for the block [at column 15, lines 45-55, as the lowest rate and highest rate bound commands set the frame rate].

19. Regarding claim 14, Jacobs [at column 46, lines 33-41] describes a computer embodiment in which audio information is compressed at a determined quantization. Jacobs describes the content and functionality of the recited limitations recognizable as a whole to one versed in the art as the following terminology:

computer-readable medium encoded with computer-executable instructions for causing a computer programmed thereby to perform a method [at column 46, lines 33-41, as digital signal processor or ASIC under program control];

determining one first target quality parameter (or more) indicating an audio quality that is acceptable [see Fig. 7, item 204, and its description, especially at column 24, lines 15-24, of a resulting value that results from current frame LSPs and that is used to ensure quality compared to a threshold that provides an indication other than exceeding the threshold to ensure quality of speech];

number of bits produced [at abstract, as rate corresponding to number of bits representative of frame];

determining plural target bitrate parameters [at column 15, lines 45-49, as the rate bound command allowing the lowest rate allowed and the highest rate allowed];

a first one indicating a minimum acceptable number of bits produced [at column 15, lines 45-49, as the rate bound command allowing the lowest rate allowed];

a second one indicating a maximum acceptable number of bits produced [at column 15, lines 48-49, as the rate bound command allowing the highest rate allowed];

compressing audio information [at column 2, lines 39-42, as perform variable rate vocoding to accomplish compression to reduce the amount of data to represent speech inherently containing period of silence];

wherein quantization of the information is based upon the first target quality parameter [see Fig. 12, items 442, 454, and their descriptions, especially at column 24, lines 4-24, of implementing quantization of the current frame LSPs for speech using the resulting value that results to ensure quality];

wherein quantization of the information is based upon the first target bitrate parameter [at column 15, lines 48-51, as "if" the rate is less than the lowest rate allowed the rate is set to the lowest allowable value];

and wherein quantization of the information is based upon the second target bitrate parameter [at column 15, lines 45-48, as "if" the rate is greater than the highest rate allowed the rate is set to the highest allowable value].

20. Regarding claim 15, Jacobs also describes:

the information is a block of frequency coefficients [see Fig. 7, items 208, 210, 222, and their descriptions, especially at column 25, lines 7-10, of an encoded frame of LSP frequencies].

21. Regarding claim 16, Jacobs also describes:

the first target quality parameters are for the block [at column 24, lines 18-23, of a threshold that provides an indication to ensure quality compares a resulting value that results from current frame LSPs];

the first target bitrate parameter and the second target bitrate parameter are for the block [at column 15, lines 45-55, as the lowest rate and highest rate bound commands set the frame rate].

22. Regarding claim 17, Jacobs also describes:

quantizing the audio information [see Fig. 12, items 442, 454, and their descriptions, especially at column 24, lines 4-6, of implementing quantization of the current frame LSPs for speech];

computing the quality measure based upon the audio information [see Fig. 7, item 204, and its description, especially at column 24, lines 15-21, of the resulting value as the sum from current frame LSPs];

the audio information is quantized [see Fig. 4, items 88, 90, 92, and their descriptions, especially at column 11, lines 16-21, of an option for quantized LSPs making a rate determination];\

comparing the quality measure to the first target quality parameter [see Fig. 12, items 442, 444, and their descriptions, especially at column 24, lines 18-23, of comparing a resulting value that results from current frame LSPs and that is used to ensure quality to a threshold that provides an indication to ensure quality].

23. Regarding claim 19, Jacobs also describes:

a first quantization loop that adjusts the quantization until satisfaction of the first target quality parameter [see Fig. 4, items 88, 90, 92, and their descriptions, especially at column 11, lines 16-21, of quantize, test rate, increase rate, quantize, . . . rate too low = N];

a second quantization loop adjusts the quantization until satisfaction of the first and second target bitrate parameters [see Fig. 9, items 270, 272, 274-292, 296, and their descriptions, especially at column 15, line 16-column 17, line 27, of computing the threshold, comparing, cycling, computing the threshold, . . . until "if" the rate is less than the lowest rate allowed and "if" the rate is greater than the highest rate allowed].

Claim Rejections - 35 USC § 103

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Chiang '846 and Azadegan

25. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. [US Patent 6,160,846] (Chiang '846) in view of Azadegan et al. [US Patent 5,623,424].

26. Regarding claim 4, Chiang '846 describes the included claim elements as indicated elsewhere in this Office action. However, when Chiang '846 describes constraining the quality and setting the quantization for macroblocks, Chiang '846 does not describe how the size of the macroblock that is used setting the quality target might be determined. In particular, Chiang '846

does not explicitly describe selecting a block size from a plurality of block sizes and a control parameter computed with normalizing the block size.

Like Chiang '846, Azadegan [at columns 1-2] describes quantizing a block of information and coding it, wherein the encoder adjusts size of the quantizing without changing a bitrate requirement that was previous calculated for an encoded stream of data. In addition, Azadegan works with the quality of a plurality of macroblocks and normalizes their size. Azadegan describes it as follows:

plural available block sizes [see Fig. 13, items IN, OUT, PRIORITY, and their descriptions, especially at column 27, lines 42-44, of time periods of the edit segments of sizes 00:01:00:01-00:02:00:00, 00:02:07:00-00:03:20:00, and 00:04:00:00-00:04:50:00];

a block has a size selected from among them [at column 28, lines 52-58, as the ith time period having Ni number of frames of the edit segment is assigned a priority];

normalize block size when computing a value for the block [at column 28, lines 46-65, as normalize the size(s) of the section i and calculate the factor k4 using the normalization Ni/N];

the adjustment is also in view of that value [at column 29, lines 10-22, as determine the target number of bits allocated based on the size normalization factor k4].

As indicated, Azadegan shows that selecting a block size from a plurality of block sizes and a control parameter computed with normalizing the block size was known to artisans at the time of invention. Since Azadegan [at columns 2-3] also points out that working with sets of macroblocks (slices) has the advantage of preventing visual artifacts from too-coarse or too-fine quantization when adjusting the number of bits, it would have been obvious to one of ordinary skill in the art of block quantization at the time of invention to include the concepts described by Azadegan at least selecting a block size from a plurality of block sizes and a control parameter

computed with normalizing the block size for blocks of information that Chiang '846 quantizes because that would also control quality for Chiang '846 by preventing visual artifacts from too-coarse or too-fine quantization when adjusting the number of bits.

Chiang '846 and Jacobs

27. Claims 5-6, 11, 18, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. [US Patent 6,160,846] (Chiang '846) in view of Jacobs et al. [US Patent 5,414,796].

An artisan in the field of quantization for compression will understand that any data object, such as an image of Chiang '846, a segment of speech of Jacobs, a page of text, or a video sequence, can be broken into a series of steps, including (1) decomposing the object into a collection of tokens; (2) representing the tokens by binary strings that have minimal length in some sense; and (3) encoding to a further representation of the binary strings for transmission or storage.

28. Regarding claim 5, Chiang '846 describes the included claim elements as indicated elsewhere in this Office action. Chiang '846 also describes:

the adjusting is done in a quality control quantization loop and in a bit-count control quantization loop following the quality control quantization loop [see Fig. 2, items 210-260, and their descriptions, especially at column 11, lines 1-23, of regression modeling to maintain the optimal quantization scale such that a constant quality is maintained];

the bit-count control quantization loop following the quality control quantization loop [see Fig. 2, items 220, 250, and their descriptions especially at column 11, lines 12-28, of the

regression refining the calculation of the quantizer scale after calculating the modifier based on quality].

However, Chiang '846 does not explicitly describe de-linked a quality control quantization loop and bit-count control quantization loop.

Like Chiang '846, Jacobs [at Fig. 7 and column 15] describes quantizing a block of information subject to quality and bitrate constraints, and Jacobs describes:

the adjusting is done in a quality control quantization loop [see Fig. 4, items 88, 90, 92, and their descriptions, especially at column 11, lines 16-21, of quantize, test rate, increase rate, quantize, . . .]; and

the adjusting is done in a bit-count control quantization loop [see Fig. 9, items 270, 272, 274-292, 296, and their descriptions, especially at column 16, line 16-column 17, line 27, of computing the threshold, comparing, cycling, computing the threshold, . . .];

the bit-count control quantization loop de-linked from the quality control quantization loop [see Fig. 4, items 84,86, 88, 90, 92, and their descriptions, with DECIDE RATE separated from QUANTIZE LSP by LPC TO LPS TRANSFORM].

As indicated, Jacobs shows that a de-linked quality control quantization loop and bit-count control quantization loop were known to artisans at the time of invention. Since Jacobs [at column 14, lines 57-60] also points out that subsystems that are independent of each other has the advantage of being optional, i.e. not performed at all, it would have been obvious to one of ordinary skill in the art of quantization at the time of invention to include the concepts described by Jacobs at least a de-linked quality control quantization loop that is optional modification of the result of a delinked bit-count control quantization loop rather than Chiang '846's recursion to

recalculate the bitrate because the processing load and time delay due to recursive processing would be reduced or eliminated.

29. Regarding claim 6, Chiang '846 also describes:

different adjustment rules in the quality control quantization loop and the bit-count control quantization loop [see Fig. 2, items 220, 230, 250, and their descriptions, especially at column 10, line 50-column 12, line 39, of initializing, calculating, and recursion to update the quantizer scale using complexity, but calculating a modifier such that a quality is maintained by the constraint of weighting according to a human visual system].

30. Regarding claim 11, Jacobs describes the included claim elements as indicated elsewhere in this Office action. Jacobs also describes:

computing the quality measure based upon the block of frequency coefficients [see Fig. 7, item 204, and its description, especially at column 24, lines 15-21, of the resulting value as the sum from current frame LSPs];

the block of frequency coefficients is quantized [see Fig. 4, items 88, 90, 92, and their descriptions, especially at column 11, lines 16-21, of an option for quantized LSPs making a rate determination];

encoding the quantized block (of the frequency coefficients) [at column 2, lines 39-42, as perform variable rate vocoding to accomplish compression to reduce the amount of data to represent speech inherently containing period of silence];

computing the bit-count measure [at column 15, lines 25-43, as select and maybe modify the rate based on the previous frame];

computing it based upon the encoded block of frequency coefficients [at column 25, lines 7-42, as the quantized, encoded LSP frequency values are previous frame values for use during the current frame].

Jacobs [at Fig. 2, item 236 and Fig. 18, item 676] describes that the quantized data must be coded for CDMA telephone transmission as disclosed elsewhere, but Jacobs does not describe the particular details. In particular, Jacobs does not explicitly describe entropy encoding.

At column 12, lines 12-18, Jacobs encourages the use of other representation of the coding for other system applications. As to other applications, as artisan in the field of compression for encoding and transmission, will understand that any data object, such as a segment of speech, an image, a page of text, or a video sequence, can be broken into a series of steps, including (1) decomposing the object into a collection of tokens; (2) representing the tokens by binary strings that have minimal length in some sense; and (3) encoding to a further representation of the binary strings for transmission or storage. A known encoding technique is entropy encoding, as used by Chiang '846 for its benefits.

Like Jacobs, Chiang '846 [at abstract] describes quality of information is controlled at a determined bitrate and compressed at a determined quantization. For transmitting the information, Chiang '846 describes:

entropy encoding a block of frequency coefficients [at column 8, lines 21-37, as encoding a string of quantized DCT coefficients with a type of entropy encoder].

As indicated, Chiang '846 shows that entropy encoding was known to artisans at the time of invention. Since Chiang '846 [at column 8, lines 27-33] also points out that entropy encoding schemes are well known to have the advantage of coding efficiency and reversibility, it would have been obvious to one of ordinary skill in the art of encoding at the time of invention to include

the concepts described by Chiang '846 at least entropy encoding for another application such as Chiang '846's multimedia coding following Jacobs's encouragement, because entropy encoding schemes are well known to have the advantage of coding efficiency and reversibility.

31. Claim 18 sets forth additional limitations similar to limitations set forth in claims 10 and 11. Jacobs and Chiang '846 describe and make obvious the additional limitations as indicated there, where the LSP parameters of speech are audio information, minimum-bits target and maximum-bits target are first and second target bitrate parameters.

32. Regarding claim 22, Jacobs describes the included claim elements as indicated elsewhere in this Office action. Jacobs also describes:

the quality target parameter [at column 24, lines 18-23, as at column 24, lines 15-24, of a resulting value that results from current frame LSPs and that is used to ensure quality compared to a threshold that provides an indication other than exceeding the threshold to ensure quality];

the quality target parameter is a function comprising a bit count [at column 24, lines 13-15, as the rate logic receives the initial rate decision].

Jacobs [at column 3, lines 1-33] also describes reduced output rate for low speech activity where the information to be encoded is not busy. However, Jacobs does not explicitly describe a goal bit count and a complexity estimate of the speech.

Like Jacobs, Chiang '846 [at abstract] describes quality of information is controlled at a determined bitrate and compressed at a determined quantization. For assessing target quality, Chiang '846 describes:

the quality target parameter is a function comprising a goal bit count factor [at column 13, lines 18-30, as the (rate) distortion function is minimized subject to a target bit allocation];

the quality target parameter is a function comprising a complexity estimate factor [at column 12, lines 37-43, as the constant visual quality produces optimal quantization using a complexity model].

As indicated, Chiang '846 shows that a quality target parameter comprising a goal bit count factor and a complexity estimate factor was known to artisans at the time of invention. Since Chiang '846 [at column 14, lines 43-46] also points out that this has the advantage of producing the smallest distortion, it would have been obvious to one of ordinary skill in the art of quantization to compress representation of information at the time of invention to include the concepts described by Chiang '846 at least a quality target parameter comprising a goal bit count factor and a complexity estimate factor with Jacobs' bit rate alteration due to unacceptable quality of encoded information because this would produce the smallest distortion in information resulting from the quantized LSPs.

33. Regarding claim 23, Chiang '846 also describes:

the complexity is a composite of past complexity and future complexity [at column 15, lines 3-35, as the projected number of bits for a frame accounts for the number of bits used for the previous frame and the projected average number need to code a remaining frame, where, column 3, lines 3-5, points out that the number of bits to encode is a measure of the complexity].

34. Regarding claim 24, Chiang '846 also describes:

the complexity estimate is based on a complexity estimate reliability measure [at column 12, lines 40-64, as the complexity estimate model was determined by comparing a root mean square error of the fit of linear, second, and third order models].

35. Regarding claim 25, Jacobs also describes:

the audio information is a block of frequency coefficients [see Fig. 7, item 204, and its description, especially at column 24, lines 15-24, of current frame LSPs of speech];

Chiang '846 also describes:

the information is a block of frequency coefficients [at column 8, lines 21-22, as a string of DCT coefficients are encoded];

the goal bit count is based upon the size of the block [at column 13, lines 18-59, as the target bit allocation is divided by (normalized to) the total number of macroblocks in the present frame];

the goal bit count is based upon the maximum block size [at column 13, lines 18-59, as the target bit allocation and the output buffer constrained are used].

Chiang '846 and Mohsenian

36. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. [US Patent 6,160,846] (Chiang '846) in view of Mohsenian [US Patent 6,278,735].

37. Regarding claim 8, Chiang '846 describes the included claim elements as indicated elsewhere in this Office action. Chiang '846 also describes various control parameters. However,

Chiang '846 does not explicitly describe lowpass filtering a value of a control parameter as part of a series of values.

Like Chiang '846, Mohsenian [at column 8, lines 28-39] describes quantization adjustment that assures equal quality of encoded frames. Mohsenian also describes:

the adjustment is in view of a control parameter for the block [at column 12, lines 32-35, as allocations (of number of bits) that are unrealistic are prohibited by the term Zk];

a value of the parameter is filtered as part of a series of values [at column 11, lines 63-67, as parameter Zk is updated (by the regressive equation) to the Z_k value with the Z_{k-1} value];

the filter is lowpass [at abstract, as the control strategy is applied by a low pass filter].

As indicated, Mohsenian shows that lowpass filtering a value of a control parameter as part of a series of values was known to artisans at the time of invention. Since Mohsenian [at column 12, lines 33-34] also points out that lowpass filtering the Z_k control parameter as part of a series of values of Z_k with previous Z_k, represented by Z_{k-1} regressively, has the advantage of a safety measure to prohibit unrealistic bit allocations, it would have been obvious to one of ordinary skill in the art of quantization at the time of invention to include the concepts described by Mohsenian at least lowpass filtering a value of a the parameter Z_k as part of a series of values with Chiang '846's bitrate determination because that would control unrealistic bit allocations.

38. Regarding claim 9, Chiang '846 describes the included claim elements as indicated elsewhere in this Office action. Chiang '846 also describes various control parameters. However, Chiang '846 does not explicitly describe a value of a control parameter as part of correcting a bias in a model relation of quality and bitrate to step size

Like Chiang '846, Mohsenian [at column 8, lines 28-39] describes quantization adjustment that assures equal quality of encoded frames. Mohsenian also describes:

a value of the control parameter for the block [at column 7, lines 51-53, as accumulated error that is fed back to the control technique];

the adjustment is in view of the value [at column 7, lines 51-54, as the accumulated error is fed back to ensure that the bitstream meets the bit budget];

bias in a model that relates quality and bit count (or bitrate) to quantization step size [at column 7, lines 42-65, as accumulated error by adding differences between ideal and actual bits calculated with the aid of the rate-quantization model];

computing the value to correct that bias [at column 7, line 60-column 8, line 24, as the accumulated error is computed, the ideal picture target is adjusted by the accumulated error, and a new target is computed after encoding];

39. As indicated, Mohsenian shows that a value of a control parameter as part of correcting a bias in a model relation of quality and bitrate to step size was known to artisans at the time of invention. Since Mohsenian [at column 8, lines 10-24] also points out that controlling the bias has the advantage of allowing the bit budget for the next picture to be better adjusted for over production or underproduction of bits, it would have been obvious to one of ordinary skill in the art of quantization at the time of invention to include the concepts described by Mohsenian a value of a control parameter as part of correcting a bias in a model relation of quality and bitrate to step size with Chiang '846's bitrate determination because that would allow the bit budget to be better adjusted for over production or underproduction of bits.

Jacobs and Chiang '497

40. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. [US Patent 6,243,497] (Chiang '497) in view of Jacobs et al. [US Patent 5,414,796].

An artisan in the field of quantization for compression will understand that any data object, such as an image of Chiang '497, a segment of speech of Jacobs, a page of text, or a video sequence, can be broken into a series of steps, including (1) decomposing the object into a collection of tokens; (2) representing the tokens by binary strings that have minimal length in some sense; and (3) encoding to a further representation of the binary strings for transmission or storage.

41. Regarding claim 20, Jacobs describes the included claim elements as indicated elsewhere in this Office action.

Jacobs [at Fig. 2, item 236 and column 15, lines 52-65] also describes the rate bound commands may be set or modified by transmission modes through the buffer of an encoder. Jacobs describes that the quantized data must be coded for CDMA telephone transmission as disclosed elsewhere. At column 12, lines 12-18, Jacobs encourages the use of other representation of the coding for other system applications, but Jacobs does not describe the particular details of the buffer to the encoder. In particular, Jacobs does not explicitly describe rate bounds comprising average bit count, buffer fullness, and buffer sweet spot.

Like Jacobs, Chiang '497 [at abstract] describes quality of information is controlled at a determined bitrate and compressed at a determined quantization. For encoding and transmitting the information, Chiang '497 describes:

a target bitrate comprising an average bit count estimate [at column 7, lines 30-52, as a target bit rate computed using a weighted average of numbers of available bits and used bits];

the target bitrate comprising buffer fullness [at column 7, lines 58-67, as the target bit rate is adjusted by the portion of the buffer that contains bits and the remaining space in the buffer];

the target bitrate comprising buffer sweet spot [at column 8, lines 1-17, as limiting target bit rate and increasing the target bit rate if the buffer is less than half full and decreasing the target bit rate if more than half full].

As indicated, Chiang '497 shows that rate bounds comprising average bit count, buffer fullness, and buffer sweet spot were known to artisans at the time of invention. Since Chiang '497 [at column 8, lines 12-20] also points out that limiting the adjustment of the target bit rate has the advantage of keeping the encoder out of danger of creating a pending overflow, it would have been obvious to one of ordinary skill in the art of information encoding at the time of invention to include the concepts described by Chiang '497 at least rate bounds comprising average bit count, buffer fullness, and buffer sweet spot for either another application such as Chiang '497's multimedia coding following Jacobs's encouragement or the lowest (first) bit rate of Jacobs' own microprocessor because that has the advantage of keeping the encoder out of danger of creating a pending overflow.

42. Regarding claim 21, Jacobs describes the included claim elements as indicated elsewhere in this Office action.

Jacobs [at Fig. 2, item 236 and column 15, lines 52-65] also describes the rate bound commands may be set or modified by transmission modes through the buffer of an encoder. Jacobs describes that the quantized data must be coded for CDMA telephone transmission as

disclosed elsewhere. At column 12, lines 12-18, Jacobs encourages the use of other representation of the coding for other system applications, but Jacobs does not describe the particular details of the buffer to the encoder. In particular, Jacobs does not explicitly describe rate bounds comprising average bit count, buffer fullness, and buffer sweet spot.

Like Jacobs, Chiang '497 [at abstract] describes quality of information is controlled at a determined bitrate and compressed at a determined quantization. For encoding and transmitting the information, Chiang '497 describes:

a target bitrate comprising an average bit count estimate [at column 7, lines 30-52, as a target bit rate computed using a weighted average of numbers of available bits and used bits];

the target bitrate comprising buffer fullness [at column 7, lines 58-67, as the target bit rate is adjusted by the portion of the buffer that contains bits and the remaining space in the buffer];

the target bitrate comprising buffer sweet spot [at column 8, lines 1-17, as limiting target bit rate and increasing the target bit rate if the buffer is less than half full and decreasing the target bit rate if more than half full].

As indicated, Chiang '497 shows that rate bounds comprising average bit count, buffer fullness, and buffer sweet spot were known to artisans at the time of invention. Since Chiang '497 [at column 8, lines 12-20] also points out that limiting the adjustment of the target bit rate has the advantage of keeping the encoder out of danger of creating a pending overflow, it would have been obvious to one of ordinary skill in the art of information encoding at the time of invention to include the concepts described by Chiang '497 at least rate bounds comprising average bit count, buffer fullness, and buffer sweet spot for either another application such as Chiang '497's multimedia coding following Jacobs's encouragement or as the highest (second) bit rate of Jacobs'

own microprocessor because that has the advantage of keeping the encoder out of danger of creating a pending overflow.

Conclusion

43. The following references here made of record are considered pertinent to applicant's disclosure:

Proctor et al. [US Patent 5,926,226] describes entropy encoding and quantization suitable for speech and/or video that controls quantization according to a selection of quality ranges.

Reed et al. [US Patent 6,212,232] maintains a constant perceived quality by refraining from updating the target number of bits unless the frame rate changes.

Hui [US Patent 6,654,417] describes quality and bit rate control as a function of complexity factor within maximum and minimum quality limits.

44. Any response to this action should be mailed to:

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306, (for formal communications intended for entry)

Or:

(703) 872-9306, (for informal or draft communications, and please label "PROPOSED" or "DRAFT")

Patent Correspondence delivered by hand or delivery services, other than the USPS, should be addressed as follows and brought to U.S. Patent and Trademark Office, Customer

Service Window, **Mail Stop Amendment**, Randolph Building, 401 Dulany Street, Alexandria, VA 22314

45. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald L. Storm, of Art Unit 2654, whose telephone number is (703) 305-3941. The examiner can normally be reached on weekdays between 8:00 AM and 4:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see http://pair-direct.uspto.gov.

Donald L. Storm

Donald L. Storm
Patent Examiner
Art Unit 2654

January 21, 2005